



inps journal

Indiana Native Plant Society

Fall 2023

Springing into Action: A Plant Rescue

By Freya Berntson

*"I speak for the trees, for the trees
have no tongues." – The Lorax*



Joanna Stebing

Late April proved a perfect time for plant rescue. It provided the combination of lovely weather and maximum visibility of spring ephemerals.

Allen County's suburban areas are expanding quickly, with new housing developments popping up throughout the county. A number of these new structures have and will be placed on land that has been forested for decades, if not hundreds of years.

Are you curious about what a site looked like decades ago? A digital, aerial tour of surrounding lands via a county's geographical information system (GIS) is a great way to explore the history of a piece of land! *HistoricalAerials.com* also offers the option to compare aerials side by side.

Areas that have been allowed to grow as forests for decades serve as refugia for native woodland understory communities including shrubs and herbaceous plants, as well as the wildlife that depends on them. A certain level of habitat loss in association with new construction sites is unavoidable. Knowing this, one might want to "rescue" plants from a site slated for development in advance of the changes associated with new construction. Therein lies the challenge! If you don't have a connection to the property development group, it can be difficult to obtain permission to perform that rescue.

Enter Kelly Wheat, a perceptive member of the Northeast Chapter of INPS (NE INPS). Kelly is very knowledgeable of native plants and over time has collected and transplanted many

natives into her yard as the neighborhood grew around her. She realized, however, that her personal garden had finite space and that there were MANY more plants that could be saved, particularly in the last wooded lot in her northern Allen County neighborhood.

As the woodland wildflowers began to bloom this spring, Kelly went into action. A member of the leadership of her neighborhood HOA, she

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was able to create that much-needed connection to the developers. Kelly requested and was granted permission to enter and remove plants from the future construction site. With that needed permission in-hand, she contacted the NE INPS board seeking assistance with a plant rescue; and, one day later, I visited the site with her to assess our options.

The site she showed me was gorgeous! A full canopy of hickory and maple trees (not leafed out yet) protected an herbaceous layer full of great white trilliums (*Trillium grandiflorum*), woodland phlox (*Phlox divaricata*), early meadow rue (*Thalictrum dioicum*), and many other native woodland spring bloomers. The roughly two-acre property gently sloped north toward a beautiful forested wetland to the east with woodland continuing north into privately owned property.

Rescue — continued on page 2

Rescue — continued from front page

A species that Kelly was particularly interested in was a sweet little violet with lobed leaves. Initially thinking this was prairie violet (*Viola pedatifida*), an Indiana state threatened species, I reached out to our State Botanist Scott Namestnik seeking advice on best practices for relocating a listed species. I sent a couple of photos with my question, and Scott quickly conferred with violet expert Dr. Harvey Ballard of Ohio University and replied that the true identity of this plant was actually *Viola baxteri*, Baxter's violet. A thorough description of this species can be found on Dr. Ballard's web page at <https://people.ohio.edu/ballardh/vgpena/taxa/violabaxteri.htm>.

Baxter's violet is an extremely rare plant in Indiana, listed as endangered and critically imperiled in the state. The advice given: try to relocate what we could to nearby nature preserves with similar habitat. The site happened to be just a few miles from some of ACRES

including nearly 80 *Viola baxteri*. The Baxter's violets were planted at ACRES Land Trust properties later that weekend. The rest of the plants went to a variety of destinations, including local restored natural areas like Arrowhead Prairie. Many went home with volunteers to be planted on their private properties. Roughly 100 plants were staged in my backyard, where they waited to be distributed at the NE INPS annual plant swap about a month later.

This plant rescue could not have happened if it weren't for the people who took action. Although events like this one are not a solution to the ecological crisis brought on by habitat loss, they serve an important purpose. The plants that were rescued from this site would have otherwise been destroyed when construction on the site began. Perhaps saving those individuals will one day genetically benefit the species as a whole. After all, as John Muir observed "When we try to pick out anything by itself, we find it hitched to everything else in the Universe." Equally important, participation in something like a plant rescue offers each of us a chance to see what we're saving when we support the protected natural areas required for the plants we love to grow undisturbed.

Endless thanks to everyone who helped with this endeavor!

Freya Berntson is a member of the Northeast Chapter of INPS and serves as their Stewardship Chair.



Some of the potted rescue-plants await distribution to natural areas, restoration efforts, or plant sales.

Land Trust's nature preserves, so my next step was to reach out to Stewardship Director Evan Hill. Evan graciously agreed to receive all of the *V. baxteri* we were able to rescue and plant them on ACRES properties.

While working out the plan for relocating a state endangered violet, I had to coordinate an actual plant rescue event. Action like this can only happen with people power, and I am beyond thankful to the teams involved in making it happen. On short notice, NE INPS was able to get a pop-up plant rescue notice out to our members.

The outpouring of offers to assist was simply inspiring. Several NE INPS members as well as Fort Wayne Parks and Recreation reached out to donate pots to help with the effort. Even more members signed up to donate their time to help. Just two weeks after Kelly sent her initial message, a team of over 20 plant enthusiasts gathered in the cul-de-sac at the edge of the property on a Saturday morning. After a brief introduction to the site, we got to work. Volunteers dug, potted, and packed native plants for four hours.

Hundreds of plants were removed from the site,

Lessons — continued from right

plant aficionados. The parallels she draws to the human community range from thought-provoking to downright revelatory.

A heavily annotated work, *Lessons* tends toward highly technical language. Readers with a limited scientific background might need to take extra time to digest the botanical concepts, which are well worth the investment.

Dr. Montgomery will speak at the 2023 INPS Annual Conference, where her books will be available for purchase.

Shawndra Miller is communications manager for Central Indiana Land Trust and secretary of the board of INPS Central Chapter.

Book Review:

Lessons from Plants

by Beronda L. Montgomery, Ph.D.

Reviewed by Shawndra Miller

Plants make choices. They network and communicate, compete and collaborate. They assess risks and allocate their energies accordingly. They alter their behavior and morphology according to environmental cues, and they even spread the word about threats to kin and non-kin alike.

All of which plant biologist Beronda Montgomery explores in fascinating detail in *Lessons from Plants* (Harvard University Press). In six dynamic chapters, the book reveals the extraordinary lives of plants—and extrapolates their resilience and adaptability into teachings for the human community.

Dr. Montgomery's passion for nurturing the next generation and uplifting marginalized communities shines throughout the book. If the insights in *Lessons* are any indication, her mentoring is grounded in deep reflection and scientific understanding. In tribute to her work, the international journal *Cell* listed her as one of 100 Inspiring Black Scientists in America in 2020.

With measured reasoning, Montgomery urges readers to overcome what she calls “plant bias”—the tendency to overlook plants and their unsung abilities. Humans, she notes, tend to be oblivious to the incredible beings living nearby, sometimes right under our feet. To counter this, she shares a host of scientific findings in the botanical field, offering the latest data on how plants perceive, respond to, and alter their worlds. Far from being the static organisms many people imagine, plants exhibit self-knowledge and stunning adaptive ability.

The book is structured into six chapters (plus an Introduction and Conclusion), each focused on a key aspect of plant behavior and its relevance to human life. Each chapter closes with Montgomery's insightful reflections on how plant behavior holds a lesson for humans—embracing resilience in the face of adversity, sharing resources, nurturing diversity, and more.

Native plant lovers will enjoy gaining molecular-level knowledge of what these organisms are capable of. For example, Montgomery discusses how plants communicate with one another through chemical signaling and symbiotic relationships. Volatile organic compounds are “a form of

language” that transmit information not just within species, but to different species, and even to other groups like bacteria and insects.

In several places, *Lessons from Plants* considers the interrelatedness of mycorrhizal fungi and plants, and what this might mean if we took it as a model. She advocates creating diverse networks of support in the human community, noting that individuals fare better in a diverse environment than they do individually or with others similar to themselves.

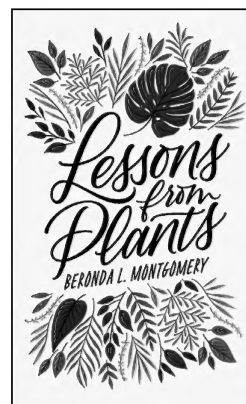
In one of the most intriguing passages, Montgomery describes pioneer plants, the first plants to grow in a barren environment. These are the hardy sprouts that take hold in sidewalks, cliff edges, and even hardened lava. They are able to “track trace moisture in the most minute of cracks” and grow in a medium with extremely limited nutrients.

But many of them can actually increase the availability of nutrients. They do this by either forming relationships with beneficial bacteria or fungi, or by excreting compounds to make nutrients more soluble. As they take hold, they prepare the way for the second wave of succession plants—altering the pH of the soil, increasing soil stability, and reducing the impact of damaging winds.

The author argues that similar skills are required to promote positive change in human environments. By emulating these scrappy plants, committed leaders can push through obstacles, creating change often with minimal resources. These changemakers' work—typically requiring “an initial period of disruption”—can change the space to support the next wave of change agents, who can go on to sustain more systemic transformation.

Lessons from Plants is an illuminating book offering a fresh perspective on the plant kingdom, as well as a call to action for attending more closely to our plant kin. Not counting the footnotes taking up the last part of the book, the text tops out at 150 pages. Line drawings and quotes open each chapter with an artful, poetic meditation. Simple illustrations augment the narrative, demonstrating plant life cycle, succession, etc.

Beronda Montgomery's passion for her subject matter shines through, making this a thought-provoking read for nature enthusiasts and native



Lessons—continued at left

2023 INPS Annual Conference

It's time to register for AC 2023 on October 28! You can join us in person (registration deadline October 15) or via Zoom (deadline October 28). All the details and the registration link are at <https://indiananativeplants.org/ac2023-preview/>

Here are the top ten reasons to join us:

1. **The Speakers.** Well, obviously! This year we have a sterling lineup, starting with our two keynote speakers, Dr. Beronda Montgomery (who will share "Lessons from Plants" from her best-selling book) and Heather Holm (who will give guidance on creating and managing landscapes for native bees). We've carefully balanced the talks between native gardening and native plant conservation topics, meeting the interests of all our members.
2. **The Workshops.** For the first time, we are offering hands-on workshops on the day before the conference (Friday, October 27). We are delighted to have Hilary Cox offering guidance on how to design, build, and maintain a prairie garden, and Bill Daniels on how to raise native plants from seed. Learn the skills you need to create the best possible garden for your land!
3. **The Hikes.** You have a choice of three hikes on Friday – touring beautiful Griffy Lake Nature Preserve or Brown County State Park, or seeing the extensive native landscaping at Switchyard Park.
4. **Native Seed Swap.** Not surprisingly, the swap gets more popular every year because it is your chance to pick up seeds from your old and new favorite native plants. Last year there were more than 100 donations representing over 75 species to choose from. We expect this year to be even bigger. Check the INPS website for details and instructions on how to participate.
5. **Friday Evening Mixer.** There will be a chance to get together the Friday evening before the conference to rub elbows with other members; look for details on the website.
6. **30th Anniversary Celebration.** INPS turns 30 this year; join us, be part of the celebration!
7. **Exhibitors.** The exhibits next to the main speaking room will give you a chance to learn about other environmental organizations in Indiana and buy environmental-themed items from vendors.
8. **Book Sale.** We'll be selling a wide variety of books about native plants including the books by our speakers, who'll be available to sign them (looking for Christmas present ideas?).
9. **Meet INPS members.** This is your chance to meet INPS folks you only know from the incredible pictures they post in the INPS Facebook group or the articles they write for the Journal.
10. **Continuing Education Credits.** For those interested, we are setting up continuing education credits for both landscape architects and pesticide applicators. Watch for details on the website.

Clover — continued from right

fingertips that this wonderful group provides. Thanks to my positive experience with the Facebook group, I decided to become a member of the INPS organization and have learned even more about caring for our land through its newsletters, publications, and website. I credit the group for the keen eye I've developed that allowed me to catch the clover as something new-to-me, even if I didn't know what it was. I certainly have gained friends, knowledge, and unforgettable experiences since joining. And as I wrap up the story of my journey with INPS, I'm hopeful it serves as a reminder that the next novice botanist posting yet *another* ID request for Amur honeysuckle *could* someday be posting a previously-thought-to-be-extirpated rare plant! Bear with us!

Heather Davis is a proud member of the Central Chapter of INPS.

An Unlikely Pairing: My Journey with Discovering INPS and Running Buffalo Clover

By Heather Davis

After nine years in the Air Force, I was ready to return home to Indianapolis and find a house to make my home. Despite how difficult it proved to be, I was determined to find a property with some land that was close to the city. I knew I'd found something special when I discovered the urban paradise my husband, daughter, dogs, and I now call home. Three acres of woods, ravine, and a creek - yet nine short-minutes to Fountain Square? Yes please!

I love being outside and have immense respect for Mother Nature. Thrilled as I was to be able to keep this gorgeous land protected, I was clueless as to the amount of work involved in upkeep (and eventually in restoring) our new property. Cue the first few years during which I tried to find plant ID apps before they were cool, invited a DNR employee to walk with me and teach me about the property, and desperately tried to keep up with the maintenance required while working full time.

About four years ago, my husband and I realized that the woods were closing in on us ... something prompted me to look for a plant ID app again and this time – success! Little did I know it would be the beginning of the end of blissful ignorance. We quickly identified the creeping culprits causing our claustrophobia – Amur honeysuckle (*Lonicera maackii*), Japanese honeysuckle (*L. japonica*), running periwinkle (*Vinca minor*), wintercreeper (*Euonymus fortunei*) – the list goes on. In search of some hope, I decided to start learning about what *should* be growing here; thankfully I found the Indiana Native Plant Society on Facebook!

I have learned much from this group over the last few years, simply by repetition! It's helpful to see photos over and over and begin to learn the characteristics of different plants just by people asking for help with identification. We quickly became some of those people, and it was incredible to find many gems on this property, despite it drowning in invasive plants. After a year or so of trying to tackle the invasives that we now knew to be incredibly toxic and quickly overpowering our native seed bed, we decided we needed some help. Thanks to the INPS group

we were able to connect with Jack Cathcart from Oiko. The group just kept on giving. It has been such a blessing to have his help and expertise as we try to take back our woods!

On a random night after being out of town in June of 2022, I excitedly hopped down into the woods. I'd sort of gotten addicted to searching for new natives amidst all of the chaos! The area at the bottom of the hill has been the richest and most fruitful in recent years, after clearing it out in 2018 for our wedding, and this night was no exception! I immediately noticed a wild petunia (*Ruellia strepens*) and hurried over to get a picture to share in the group. As I turned the corner, a large brown flower caught my eye. I truly didn't know what it was and I didn't give it much thought. I snapped a quick picture of this funky, droopy thing and continued on to the pretty purple petunia.

That night, thanks to the INPS Facebook group, my native plant journey took an epic turn. I posted my identification requests and impatiently waited for some insights. I had done the legwork to know the one flower was a petunia but I was debating which kind.

Meanwhile, my new botanist friend I'd made in the INPS group, Esteban Coria (president of the North Chapter of INPS), sent me a direct message. He told me he had signaled some of the rare plant botanists in the group because he was pretty sure I had posted a rare clover. What ensued was a barrage of messages – Scott Namestnik, Daniel Boone, and others all weighing in on the characteristics of the clover. By the end of the night it had been confirmed – running buffalo clover, *Trifolium stoloniferum* – right here in my Marion County backyard. The first sighting in the county since 1836 was here on our little slice of urban paradise!

If it weren't for the INPS group, I likely never would have been so curious about my naturally occurring flora. And even if I had, I wouldn't have the wealth of knowledge at my



Heather Davis

After hiding for almost 190 years, running buffalo clover was photographed in a backyard in Marion County.

Clover — continued at left

Is Native Seed Supply Insufficient?

By Bill Daniels and Kevin Tunesvick

In a 2022 presentation, Dr. Stephen Fitch, Founder and Former CEO of Eden Reforestation and Projects, observed, “When it comes to seeds . . . seeds are to forests what dollars are to banks.” Reflecting on this analogy, it appears, according to a recent report (NASEM

2023), that our seed “bank account” in many parts of the US is inadequate to meet our current and future needs for addressing our climate and biodiversity crises. In

summarizing the report, the authors’ press release stated that “the insufficient supply of seeds from native plants is a major barrier to ecological restoration and other revegetation projects across the United States.”

Our public land and wildlife stewardship agencies, which manage over 640 million acres of land, are the largest buyers in the market for native plant seeds. According to the report, these agencies “are not prepared to provide the native seed necessary to respond to the increasing frequency and severity of wildfire and impacts of climate change.” In an NPR interview (Radde 2023), the Bureau of Land Management director Tracy Stone-Manning noted that “without native plants, especially their seeds, we do not have the ability to restore functional ecosystems after natural disasters and mitigate the effects of climate change.”

Local governments (states, counties, and municipalities) also struggle to find native seeds. Native seeds are used on their lands for many purposes, including following disturbances (both natural and man-made), for roadside maintenance, green infrastructure,

to control invasive species encroachment, and the enhancement of wildlife habitat. This challenge also has been seen quite dramatically by private users of native seeds, such as ranchers and farmers, landscapers, homeowner associations, and local and regional conservancies and land trusts.

So what are the challenges in acquiring native seed in Indiana? According to Chris Fox, Sycamore Land Trust’s Land Stewardship Director, “One of our biggest challenges in performing large-scale restorations is acquiring native seeds from Southern Indiana genotypes.” One would want the seed genetics to be diverse and yet as closely matched as possible to the local environmental conditions.

“Another challenge is that although Spence Restoration Nursery has been a great partner for us for North Central Indiana genotype native seeds, if they don’t have it, we often have to source out of state. Also, we have concerns relying on one ‘producer,’ if for some reason they had a ‘crop failure’ or went out of business, then we would really be in a tough spot.”

One of the authors of this article, Kevin Tunesvick, played a major role in the development and management of the seed nursery at Spence Restoration Nursery in North Central Indiana as well as making all their foundation seed collections. Given his first-hand perspective on native seed availability in his region, Tunesvick notes that, “it was true that there was little availability of Indiana genotype seed in the 1990s, but now Spence, Heartland Restoration, and JF New (currently Stantec) all produce a complementary palette of Indiana seed.” Currently, Spence Restoration Nursery supplies seed mixes for numerous projects for land trusts, park departments, and other entities containing entirely Indiana seed. Tunesvick says “The key is planning and reserving the seed in advance of harvest.”

Tunesvick now works for Eco Logic, which normally sells full installations, including site preparation, which means they know they will need the seed a minimum of 6 to 9 months in advance. They order the seed for late fall/early winter dormant sowing which is when Spence Nursery is completing the cleaning of their new crops. Occasionally they need to substitute a

Seed — continued at right



Paul Rothrock

While most farmland in east-central Indiana grows a grass called corn (Zea mays), the grass in this field, owned by Spence Restoration Nursery, is prairie dropseed (Sporobolus heterolepis). Its crop is precious native seed used in prairie restorations.

Florathon 2023

Seed — continued from left

more distant Midwest source to account for a crop failure or species they don't produce. In Tunesvick's experience, "We generally have no issues obtaining the seed mixes we want for our projects."

Tunesvick does acknowledge, though, that "most of the available Indiana genotype seed comes from the Northern glaciated portion of the state, which coincides with most of the demand," thus, supporting Chris Fox's earlier assertion, that projects requiring seed from the unglaciated portion of the state will find supply issues.

The good news for Indiana restorationists is that the Midwest is a leader in the production of native seed due to numerous prairie and wetland restoration projects. This results in steady demand that makes native seed production a viable business. Contrast that with the western US: the large variations in climate due to changes in elevation, variations in precipitation, and a great variety of landforms and geology create such a complex of habitats that make it less feasible to economically produce seeds for every situation. Further, demand may be driven by sporadic events such as forest fires, so the steady demand needed to create a viable seed production business is not present. Seed availability is and will continue to be an issue in the west and many parts of the US.

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Bill Daniels, a retired horticulturist, is a member of the South Central Chapter of INPS and Native Seed Communities Program Leader.

Kevin Tunesvick, a member of the East Central Chapter of INPS, is Senior Ecologist with Eco Logic LLC.

By Barbara Homoya

The results are in! Florathon 2023 had four teams – one new – and a total of 15 participants. Between April 15th and May 31st those four teams surveyed six different counties in search of native wildflowers in bloom. The highest species total results were: first place, Bloomin' Stellarias (South Central chapter) with 72 species; second place, Always Be Botanizing (Central



Ellen Jacquart

chapter) with 65 species; third place, Luscious Stems (North chapter) with 29 species, and fourth place, Goose Pond Hunters (South Central and Central chapters) with 20 species.

Over \$1400 was donated by two dozen donors and six new members were added to the INPS membership roll. Thank you to those donors who gave so generously and to the individuals who solicited them.

Watch for Florathon participants' stories in upcoming issues of the INPS Journal, detailing what a fun and challenging learning experience it is to do a Florathon. And please consider forming a team for Florathon 2024! The Annual Conference is a great opportunity to network with others interested in forming a team. If you have any questions or want to find a team to join you can contact Barbara Homoya, Florathon chair.

Barbara Homoya, a member of the Central Chapter of INPS, chairs the Florathon Committee. She enjoys learning to identify native wildflowers with her husband, Michael, and her son, Wes, while participating in INPS Florathons.

The Bloomin' Stellarias Florathon team – Ellen Jacquart, Mark Sheehan, David Mow, and Steve Dunbar.

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Mission

To promote the appreciation, preservation, scientific study, and use of plants native to Indiana.

To teach people about their beauty, diversity, and importance to our environment.

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South Central
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Sourwood (*Oxydendrum arboreum*)

By Michael Homoya

In far southern Indiana there's a band of counties bordering the Ohio River that could rightly be referred to as "Little Appalachia." At least when it comes to plants.

If you could hop from the Great Smoky Mountains in Tennessee to Indiana's hills between New Albany and Tell City, you would see plants that might make you think you'd never left the mountains. The roster includes mountain laurel (*Kalmia latifolia*), umbrella magnolia (*Magnolia tripetala*), and Virginia pine (*Pinus virginiana*).

Sourwood is another. While mountains aren't its only home—it grows wild, even in the Florida panhandle—most of the land it inhabits is rugged terrain. Steep rocky slopes characterize its Indiana habitat, especially those areas with rather dry, acid soil and sandstone outcrops.

Also known as sorrel tree for its sour-tasting leaves, sourwood's botanical moniker, *Oxydendrum arboreum*, was given for the same reason. The Latin name means "sour tree," from the Greek *oxys*, meaning sour, and *dendron*, meaning tree. This sourness imparts the ability of this species to act as a thirst quencher.

The tree, the only species world-wide in the genus *Oxydendrum*, is a member of the heath family (Ericaceae). This is the same plant family that includes rhododendron (*Rhododendron* spp.), mountain laurel, and blueberry (*Vaccinium* spp.). The family ties are especially apparent between blueberry and sourwood. Their tiny urn-shaped flowers are almost identical. In fact, phylogenetic analysis indicates that sourwood is a "sister group" to blueberries, sharing a branch or clade on the family tree. Unlike blueberries, however, sourwood has dry capsule fruits rather than fleshy berries. Both fruit types are common in the heath family.

Sourwood is generally a small to medium sized tree resembling the much more common sassafras (*Sassafras albidum*) in growth form and bark. The champion specimen, however, reported by the American Forests Association from Amelia, Virginia, has attained a height of 74 ft. The

species is quite attractive overall, and in some parts of the country, it's planted as an ornamental. While sourwood's natural range in Indiana is limited to the extreme south, it is tolerant of cold temperatures and can be grown throughout the state in appropriate soil conditions.

One friend of mine has successfully grown it in Grant County in east-central Indiana where he created a small island of soil having a low pH.

Several aspects of the tree warrant consideration for landscaping use, including the sprays of small white flowers that form on branch tips in mid-summer. To some people these flower clusters resemble those of lily-of-the-valley (*Convallaria majalis*), hence another common name, lily-of-the-valley tree. Its foliage of medium-sized, elliptical leaves is also attractive and commonly ablaze in red or reddish-purple in autumn.

Sourwood is not a common tree in Hoosier woodlands. It is officially designated by the DNR as State Threatened. Almost all Indiana populations of sourwood are in Perry County, but it can be found in nearby Floyd and Harrison counties.

Aside from its visual beauty, sourwood provides nectar for a gourmet honey. To celebrate its local availability, the town of Black Mountain, NC, holds an annual festival in July. Sorry, Indiana does not have sufficient numbers of sourwood trees for honey production or a festival. You'll need to go to the southern Appalachians, into the tree's main range, for that.

But, to be sure, although *Oxydendrum* may be sour, it is one sweet tree.

Michael Homoya is a past president of INPS.

The white sourwood flowers are urn-shaped, similar to those of most blueberries.



*Sourwood has leathery leaves, a common feature in the heath family, and flowers in sprays reminiscent of lily-of-the-valley (*Convallaria majalis*).*

Paul Rothrock

The Little Things That

By Lee Casebere

When watching TV during late winter or early spring, it's not unusual to see commercials aimed at the farming community with promises that the advertised product "kills nematodes." The viewer doesn't need to think too hard to conclude that nematodes must be evil creatures that need to be eliminated. In Part I of this article (Spring

2023 issue of *INPS Journal*), I referenced E.O. Wilson (2006) where he said that nematodes comprise an enormously large biomass of organisms for which the number of species is unknown but perhaps is in the millions. He posed the question, "Can anyone believe that these little creatures are just there to fill space?"

Of course, they're

not. One point that we forget or ignore regarding the little things is that the vast majority of insects and other invertebrates are not harmful to us in any way, and in fact are essential within the realm of desirable ecosystem function. Unfortunately, millions of species are unknown and undescribed, so we can't even speculate what they might contribute to the proper functioning of the collective Earth organism.

A main point I want to emphasize in these two articles about the little things is that humans are a part of, not separate from, the web of life. Echoing the quote by Peattie (1991) from Part I, "For all organisms are a part of the web; their underlying and vital relationships are one vast multiple symbiosis." And that vast multiple symbiosis functions best and most smoothly through its vast diversity of species and through the complexity of the inter-relationships between all the various species. Thus, the ecologist's mantra – diversity and complexity; diversity and complexity; diversity and complexity!

It's true that some species of nematodes are harmful to crops, yet products made to kill nematodes not only kill the bad ones, but the good ones too, as well as vast numbers of other kinds

of invertebrates. Joining the products used to fight agricultural pests in recent decades is the class of pesticides known as neonicotinoids or neonics for short. Studies indicate that they appear to be the worst in generations regarding their harmful effects on myriads of little things and larger ones as well, including birds and small mammals. Today they are largely used to coat crop seeds used over millions of acres of farmland. Thus, they are not spot treating a pest problem if and when one develops but in effect pre-treating entire fields as a kind of insurance against would-be pests should they dare to come. This exposes millions of additional acres of land and trillions of non-target invertebrates to the harmful effects of neonics. Studies are showing that neonics are long-lived in the soil and water and easily move from ag fields into the surrounding landscape. Here they are taken up by trees, shrubs, and other non-crop vegetation, where they kill non-target invertebrates. Studies also show that when treated seeds become exposed above ground, birds and small mammals eating them can die through ingesting only small quantities of the seed. In streams and lakes, the chemicals kill aquatic invertebrates which in turn affects populations of fish and other aquatic life (an especially insightful article about neonics was featured in *Living Bird* magazine [Weidensaul 2022]).

Agriculture, a big business in Indiana, employs thousands and contributes \$35 billion to Indiana's economy. But agriculture, especially row-crop agriculture, has changed dramatically over the past generation and might almost be characterized as little more than hydroponics on a massive scale. Today, natural soil fertility doesn't mean much. Fields are given specific combinations of fertilizers, herbicides, and other pesticides that produce great yields in spite of soils that have lost natural fertility associated with a healthy soil biome.

I am not oblivious to the lives and concerns of the farming community. I grew up in a small farm town and my relatives on mom's side of the family were heavily involved with farming. But farms like the ones I intimately knew as a child 60 years ago don't exist today. They have evolved into something less diverse, less interesting, and more threatening to the well-being of us all. The broader impacts of Midwest agriculture reach the shrimp producing waters of the Mississippi Delta



Lee Casebere

As a mosquito control worker prepares his equipment, a bluebird brings food to her chicks.

Run the World – Part 2

and of the Gulf coastal wetlands, resulting in a dead zone due to the many pollutants from the Mississippi, Missouri, and Ohio River watersheds. Midwest agriculture has consequences on those farmers who produce honey, apples, cherries, plums, and peaches. It's now being learned that chemicals being used for corn, beans, and wheat are implicated in the decline of honeybees and pollinators in general. Neonics are especially implicated in these declines. Fortunately for the row croppers, corn, soybeans, and wheat don't require insect pollinators in order to get a bumper crop. But do row crop farmers care about the many crops that do require insect pollinators or the farmers who raise them?

It feels as though there is little we can do when harmful practices are being done on enormous acreages of land over which we have no control or influence. But small things help if enough of us put them into practice, and attitudes can be changed. Take pride in doing good things in spite of the actions of others. Use pesticides with restraint. If a pest comes along, spot treat it as focused as possible knowing that pesticides don't just kill the intended target. If you feel you must fertilize and weed-treat your lawn, do it with restraint. Don't use mosquito control companies. In spite of what they tell you, the sprays kill more than just mosquitoes including pollinators you want visiting your native plant garden. If you have available space and a green thumb, grow your own vegetables. Otherwise, buy organic when available. Join conservation organizations whose work is aligned with your conservation, plant, and wildlife interests. Join a local land trust. Consider joining a national environmental advocacy organization whose work includes legal challenges to companies that pollute and otherwise contribute to environmental degradation. Write letters to local, state, and federal agencies and elected officials to state your positions on conservation matters of importance to your lifestyle and conscience.

And do not forget to enjoy life, and not just yours but also the non-human by becoming more attuned to your surroundings – the trees, shrubs, non-woody plants, the birds, mammals, and insects. Learn some bird songs. These things help you better understand where you live and to care about keeping it healthy. And if you partake long enough and deeply enough, they help you better

understand who you are – part of unimaginable diversity and complexity (run by little things).

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Lee Casebere, a member of the Central Chapter of INPS, is a naturalist, ecologist, nature photographer, and retired assistant director of IDNR's Division of Nature Preserves. He is a somewhat frequent contributor to this Journal.



Lee Casebere

Wading — continued from page 13

the zone – and much reduced numbers of fringed loosestrife (*Lysimachia ciliata*) and lizard tail (*Saururus cernuus*). On the other hand, flowering swamp milkweed (*Asclepias incarnata*) was prolific, reflecting its tolerance to a much wider range of moisture conditions. Of course, true marsh plants, like water willow (*Decodon verticillatus*) and pickerelweed (*Pontederia cordata*), which commingle with the meadow species in wetter areas, were unaffected.

Lake-levels are just one of several hydrologic factors that shape the distributions and adaptations of plants across the regional landscape. The unique geochemical and thermal characteristics of groundwater-dependent ecosystems such as fens and seepage swamps, for example, play a major role in the presence of many conservative species. And hydrology is only one of four major categories of geologic factors that drive the broader distributions of plants and natural communities in Chain O' Lakes State Park and beyond, the others being substrate, physiography, and geologic time. But if you want me to provide the succinct answer to the question "Why does this plant grow here, but not there?" – "It's the geology!"

Tony Fleming is a geologist and a member of the Northeast Chapter of INPS.

Bumblebee (Bombus sp.) populations, a common pollinator of Silphium, have declined by 90% over the past two decades. States with the most significant dip in bee numbers have the largest increase in the use of neonicotinoids and other agricultural pesticides. (<https://www.smithsonianmag.com/smart-news/american-bumblebee-has-vanished-from-eight-us-states-180978817/>).

Wading into the Riparian Zone

By Tony Fleming

On August 6, 2022, the INPS North and Northeast Chapters teamed up for an outing at Chain O' Lakes State Park. The hike, led by geologist Tony Fleming and botanist Scott Namestnik, circumnavigated Sand Lake, the largest of the park's 13 kettle lakes. The outing provided an object lesson in how the distributions of lake-border communities and the seasonal behavior of their constituent plants are dictated by the annual rhythm of lake-level rise and fall, and easily disrupted by extreme events.

Acting over millennia, the reliable hydrologic rhythm has created a distinctive lake-border ecosystem in which individual plant species are arrayed in discrete and typically narrow zones parallel to the shoreline. These zones reflect the moisture requirements of the various plant species, especially the depth and duration of inundation they tolerate.

As a whole, the lake-border ecosystem comprises a mosaic of natural communities – mesic forest, wet forest, shrub swamp, wet meadow, marsh – reflecting the collective responses of hundreds of individual plant species

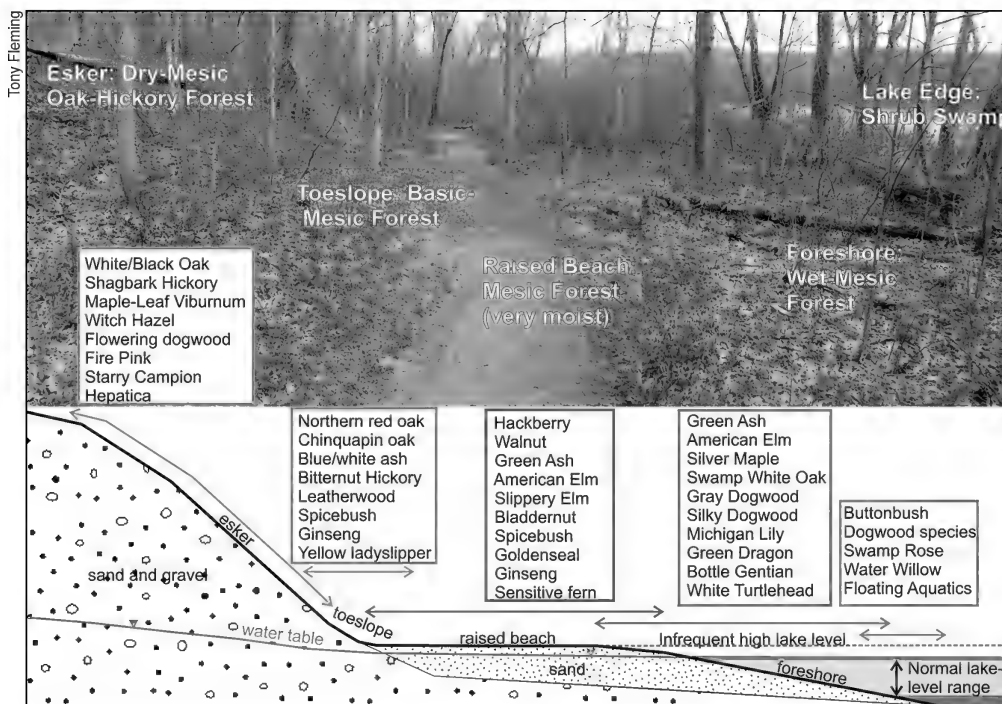
to local hydrologic conditions. Boundaries between communities are seldom sharp, and instead are subtle transitions due to the intermingling of species in response to hydrological gradients.

To illustrate these dynamics, our field trip focused on two examples at opposite ends of the hydrologic spectrum – wet-mesic lake border forests and wet meadows.

Wet-mesic lake-border forest develops along narrow shorelines consisting of raised beaches flanked by steep gravelly kames and eskers. Except for a narrow band adjacent to the lake, these well-drained beaches are seldom or never inundated or waterlogged during high lake levels but remain moist by virtue of a water table less than three feet below the surface. A typical example (see figure 1 at left) consists of either xeric oak-hickory or mesic forest on the toeslope that grades into a distinctive, rich, lake border forest with a canopy dominated by walnut (*Juglans nigra*), hackberry (*Celtis occidentalis*), American elm (*Ulmus americana*) and slippery elm (*U. rubra*), bitternut hickory (*Carya cordiformis*), and green ash (*Fraxinus pennsylvanica*), and a diverse herb layer with many of the same

species found in rich mesic forests, along with others typical of moist sites. Goldenseal (*Hydrastis canadensis*), ginseng (*Panax quinquefolius*), running strawberry bush (*Euonymus obovatus*), sensitive fern (*Onoclea sensibilis*), great blue lobelia (*Lobelia siphilitica*), and Michigan lily (*Lilium michiganense*) are prominent forbs in this moist community, while bladder nut (*Staphylea trifolia*), spicebush (*Lindera benzoin*), and pagoda dogwood (*Cornus alternifolia*) are the dominant shrubs. Water-tolerant species like silver maple (*Acer saccharinum*), swamp white oak (*Quercus bicolor*), silky dogwood (*Cornus amomum*), and green dragon (*Arisaema dracontium*) become abundant on the foreshore – the sloping, lakeward side of the beach that experiences periodic inundation

Figure 1. A typical wet-mesic lake-border forest at Chain O' Lakes. Cross section shows relations between landforms, lake-level ranges, and natural communities mentioned in the text. Colored boxes and arrows indicate the overlapping ranges of selected species within each zone. The entire lake-border is less than 50 feet wide.



at Chain O' Lakes State Park

and waterlogging. Wet-mesic lake border forests were formerly more widespread, but their footprint has shrunk in response to a combination of steadily rising lake levels over the past century and the loss of mature elm (due to Dutch elm disease) and ash (due to emerald ash borer).

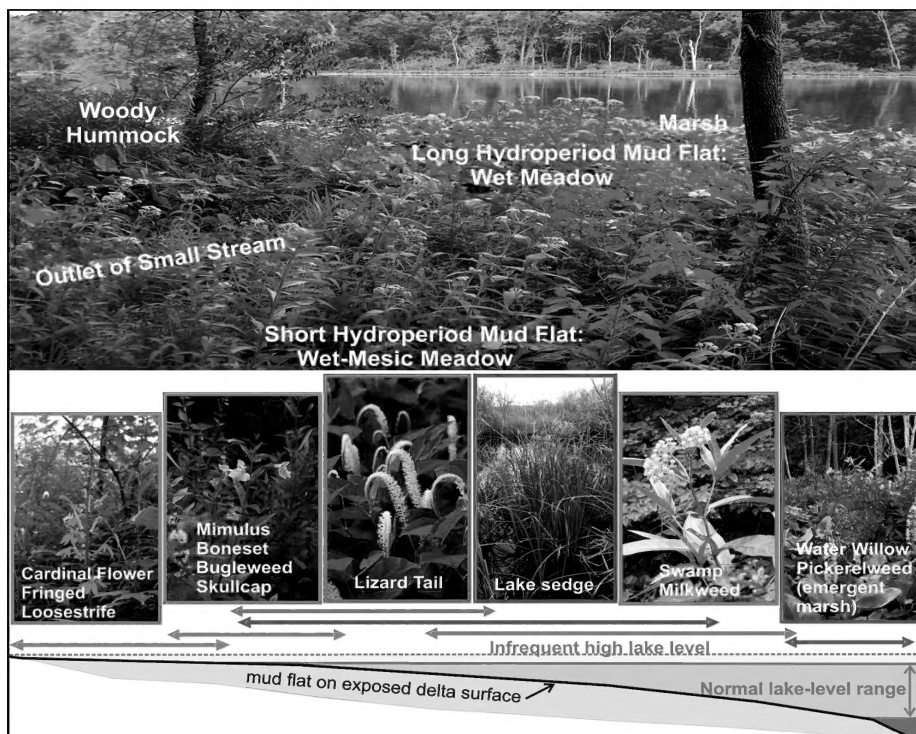
The second zone, small wet meadows, is dominated by herbaceous rather than woody species. These "pocket meadows" seldom cover more than a tenth of an acre and appear to be localized in small openings created by wind throw, rising lake levels, beaver, and ash mortality. Although the individual species are widely scattered across the park, these small, highly localized meadows are the only places where most of them occur together, affording a holistic look at some of our most iconic wetland plants and their adaptations to the hydrologic conditions that sustain them.

One small wet meadow (see figure 2 at right) observed during our 2022 field trip is situated on a muddy delta at the mouth of a ravine. In an average year, lake level reaches its high point sometime in the spring, and then gradually recedes over the next several weeks (or months, depending on precipitation), returning to "normal" mean lake level by mid-summer, when the surface of the delta becomes exposed as a mudflat and most of the species start blooming. But the retreat of standing water is not uniform across the meadow: because of the gentle lakeward slope of the delta, the higher, landward side of the meadow is exposed relatively quickly; this part of the zone experiences a brief hydroperiod (days to a few weeks at most) and the depth of inundation is typically a few inches or less. This allows the soil to drain and the waterlogging to dissipate well ahead of the bloom times of the species that inhabit this zone. Further lakeward, however, both the depth of inundation and the corresponding hydroperiod become progressively greater. The lakeward edge of the meadow may never totally drain, and even in dry years, perennially waterlogged soil is the norm. Thus, this zone favors a

different suite of species.

The seasonal timing of the species that inhabit the different hydrological zones within the meadow is exquisitely linked to the ancient rhythm of annual lake level rise and fall. Many will not reproduce if they experience untimely waterlogging or inundation. Unfortunately, extreme rainfall events, amplified by northeastern Indiana's warming climate, are becoming increasingly frequent. Sudden floods during the growing season disrupt the delicate hydrologic balance between plants and their lakeside habitats. INPS field trippers saw firsthand the results of such a flood – the park received about eight inches of rain in a few hours on July 5th, triggering an unprecedented high water event that inundated places that had never previously experienced standing water in my nearly 30 years of observing these lake borders. As a result, we observed not a single cardinal flower (*Lobelia cardinalis*), monkeyflower (*Mimulus ringens*), bugleweed (*Lycopus americanus*), boneset (*Eupatorium perfoliatum*), or skullcap (*Scutellaria lateriflora*) in flower – the species found at the drier end of

Figure 2. Small wet meadow along Sand Lake. Cross section shows relations between landforms, lake-level ranges, and other features mentioned in the text. Colored boxes and arrows indicate the overlapping ranges of selected species relative to hydroperiod.



Tony Fleming

Wading — continued on page 11

Conservation Heroes: Burtis and Bernice Horrall

By Terri Gorney Lehman

In 1965, Burtis Elliott Horrall and his wife Bernice Moody Horrall generously donated a 20-acre tract of land to ACRES Land Trust. Woodland Bog Nature Preserve, as it later was dubbed, was the third preserve acquired by what is now the oldest and largest Indiana-based land trust. The backstory to the donation was that a friend of the Horrall's, Art Eberhardt, approached the couple about purchasing the Steuben County land because it was available for less than \$1000 at a tax sale. What an amazing investment in conserving a fine piece of Indiana's natural heritage.

In 1972, Woodland Bog Nature Preserve became a state dedicated nature preserve. As is true of bogs in general, it had taken centuries to develop into what we see today, an ecosystem dominated by pin oak (*Quercus palustris*), red

osier dogwood (*Cornus sericea*), swamp white oak (*Q. bicolor*), big tooth aspen (*Populus grandidentata*), red maple (*Acer rubrum*), red elm (*Ulmus rubra*), and tamaracks (*Larix laricina*). There are stands of cinnamon fern (*Osmundastrum cinnamomeum*) and royal fern (*Osmunda spectabilis*) with fronds

reaching over five feet high. The ferns give the area a tropical appearance. The swamp forest is a good nesting place for many species of birds.

As of 2022, the preserve was closed to the public due to the lack of suitable parking and in order to protect its sensitive species from overuse. However, ACRES has designated this a priority area for future acquisitions should land adjacent to the preserve become available.

The couple behind the donation, Burtis and Bernice, were fascinating folks. This devoted couple of 60 years had two children, Louise and Ross, to whom they passed their passion for education,

family history, and the natural world.

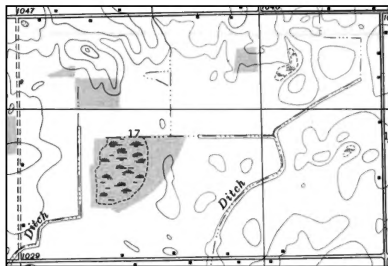
Bernice was born at Mt. Etna in Huntington County. She graduated from high school in Angola and studied for two years at Tri-State College (now Trine University), before transferring to Purdue University. She was the first woman from Steuben County to attend that university. Bernice, a woman ahead of her times, ultimately received her B.S., M.S. and Ph.D. from Purdue University. She taught in the public schools and at the college level.

This lively couple met on a blind date October 4, 1918 – a canoe trip up the Wabash River with friends that introduced them. Burtis, a native of Knox County, graduated from Purdue University and taught and did dairy research there in the 1920s. Later he taught at Tri-State College.

In 1982, Bernice and her daughter, Louise Horrall Rogulic, wrote *The Life and Times of Burtis Elliott Horrall and Bernice Moody Horrall and Their Ancestors*. This was from Bernice's lifetime of study of their family lines. It revealed that Bernice's roots in Steuben County were deep – she descended from some of the first pioneers who settled there in the 1830s. Her paternal grandmother, Lydia Welch Moody, fondly recalled those early days noting that their land was once covered with big trees, especially walnut (*Juglans nigra*).

According to her maternal grandmother, Elizabeth McMahan Sowle, in those early years many Potawatomi Indians lived in the area, reminding us of how much we owe earlier inhabitants of Indiana. Deer (*Odocoileus virginianus*), wild hogs (*Sus scrofa*), turkeys (*Meleagris gallopavo*), squirrels (family Sciuridae), partridges (family Phasianidae), quails (*Coturnix coturnix*), possum (*Didelphis virginiana*), and fish were plentiful. Tomatoes were raised for decoration and called "love apples" but were not eaten since they were still thought to be poisonous. Ink, homemade as late as 1887, was made from soft maple (*Acer* spp.) and bark of chokeberries (*Aronia* spp.). Tea was made from sage (*Salvia* sp.), mint (*Mentha* sp.), and sassafras (*Sassafras albidum*) root. Food was dried, since canning was unknown in the area. Big outdoor ovens made of brick were used to bake bread. Salt, pepper, and coffee were bought from the general store. So much changed

A 1939 topographic map reveals the agricultural pressures prevalent near the Woodland Bog site. Note the presence of agricultural ditches and limited forest cover.



A recent aerial view shows that the Woodland Bog preserve (outlined in white) has more tree cover (consisting mostly of red maple and silver maple (*Acer saccharinum*)) than 80 years ago. Given the flat topography and large peat deposit, the agricultural ditches have not caused major changes to the preserve's ecology. However, tamarack is one species that has declined since the preserve was established.

in a few generations.

And so, cheers to Bernice and Burtis for all their contributions to Indiana conservation and to Bernice who preserved her grandmothers' memories of the mid-19th century, wilder Steuben County. And to ACRES Land Trust which continues to manage the legacy of this forward-thinking family.

Terri Gorney Lehman has a fascination with the biographies of Indiana conservation and botanically oriented individuals whose contributions are under-appreciated. Terri is a member of the Northeast Chapter of INPS. In penning this article, she consulted Allen County Public Library Genealogy Center, ACRES Land Trust records, and Ancestry.com and interviewed Art Eberhardt (in 2010).

Thanks — continued from back page

competition. This patchy pattern, a characteristic of established prairies, provides one sign that our conservation efforts are working.

Some particularly exciting findings were the violet species — arrow-leaved violet (*Viola sagittata*), bird's foot violet (*V. pedata*), and field pansy (*V. bicolor*). These serve as hosts to the state endangered regal fritillary butterfly (*Speyeria idalia*) (Shuey & Edmonson 2022). Over the years, establishing violet plants at Kankakee Sands has been remarkably challenging. Finding the locales of remnant populations through the unhurried, deliberate, and methodical meanders of the plant teams was a real boon of the day. Using these locality notes, TNC staff plans to return later and study soil moisture, acidity, and other species growing in these locations for a deeper understanding of what violets need in order to thrive in the sandy soils at Kankakee Sands.

Ellen Jacquart, retired TNC employee and wandering botanist, was on the plant team and she shared, "Being able to explore in Unit K after several years away was wonderful. We found so many species as we zigzagged through the areas and what struck me was how the bison had impacted the vegetation. Bison munching on horsetail, which at one time dominated hundreds of acres in the unit, has greatly decreased its

cover. They've transformed the landscape with large areas of short vegetation and wallows."

The full results of this year's Bioblitz will be summarized and published later this year in the *Proceedings of the Indiana Academy of Science*. If you'd like to learn more about the Bioblitz and attend the 2024 Bioblitz, visit indianaacademyofscience.org/resource-center/bioblitz-events-data/ for the date and location of next year's event.

As we wait for the results from the various taxonomic groups, we at TNC give thanks to all who were able to participate, especially the 30 botanists who know that to really see things — things that are small, shriveled up, brown and crusty due to drought, or just beginning to germinate — you must go ever so slowly and carefully to notice, acknowledge, and appreciate each individual plant. Because we know that, ultimately, it's plants that provide the basis for all the amazing life that exists in, on, under, and through our incredible Kankakee Sands prairie ecosystem.

Porcupine sedge (Carex hystercina) was among the species observed in the wet prairie plantings at Kankakee Sands.



Joanna Stebing



David Verable

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Alyssa Nyberg, a member of the West Central Chapter of INPS, is a TNC Restoration Ecologist at Kankakee Sands and has worked there since 1999.

The bioblitz opening welcome at Kankakee Sands Headquarters. Biodiversity experts sampled a broad range of species groups, from amphibians to vascular plants.

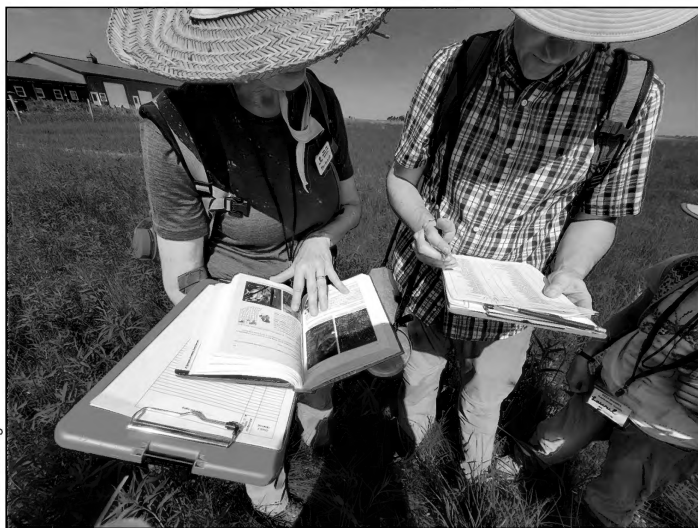


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Thanks Be to Plant People



Joanna Stebing

By Alyssa Nyberg

I always say to those new to the concept of a Bioblitz that if you'd like a fast, challenging walk, join a team of butterfly enthusiasts who chase those colorful flutterers through tall prairie grass in the heat of summer. If you want a quieter walk, join the birders on their whisper-filled strolls. Feeling hot? Join the fisheries and freshwater biologists stream-walk in search of fish, freshwater mussels, and amphibians. But for a slow, nearly meditative walk, accompany a group of botanists.

On June 3, 2023, there was a lot of walking going on at Kankakee Sands. On that day, The Nature Conservancy (TNC) partnered with the Indiana Academy of Science to host this year's Bioblitz. Perhaps you have participated in a Bioblitz or even participated in this year's Bioblitz at Kankakee Sands. If so, thank you!

On the other hand, perhaps Bioblitz is an unfamiliar idea. At ours, more than one hundred scientists, nature experts, and nature enthusiasts from around the state came to inventory as many species as possible in 24 hours. Volunteers surveyed Kankakee Sands in specialized teams, identifying ants, aquatic macroinvertebrates, bees, beetles, birds, fish, freshwater mussels, fungi, reptiles, amphibians, moths, butterflies, mammals, singing insects, snail-killing flies, spiders, and vascular plants. The findings give us a snapshot of the overall

Armed with a guide to Indiana sedges and datasheets, the plant team sets about its work.

biodiversity of Kankakee Sands and a peek into the health of our prairies.

As the sun crested the horizon that warm June morning, the teams gathered at the Kankakee Sands Headquarters for a welcome by Bioblitz organizer, Glené Mynhardt, and Kankakee Sands Site Manager, Trevor Edmonson. Then the teams were off walking the planted prairies, much as they had done during a prior Bioblitz in 2012. The birding team, which had been birding from sunup until the welcome at the Headquarters, set out again with binoculars and spotting scopes to visit upland prairie. Other animal teams grabbed nets and traps and explored acres of wet and dry prairie, even ponds and ditches. The plant team, with their big hats and backpacks laden with identification guides, hand lenses, and rulers, spread out with their heads down. Some had their plant guides in hand as they looked, searched, and sometimes crawled on the ground to identify every plant.

Stephanie Frischie, Senior Pollinator Conservation Specialist and Habitat Restoration Specialist with the Xerces Society, Great Lakes Region, led the vascular plant team. The 30-member team divided into seven subgroups, each charged with the survey of two to four locations. Some locations had been planted up to 20 years ago and have made the shift from the identical mixture of prairie species often seen in young prairie plantings to a patchwork of species that have self-sorted themselves based on soil moisture, disturbance, and

Thanks — continued on page 15